I claim:

1. A drive apparatus, comprising:

a piston slidably carried in a cylinder for stroking reciprocally along an axis of the cylinder;

a piston rod having a first end connected to the piston and a second end;

a power gear concentrically mounted to a power gear shaft;

an eccentric connected between the second end of the piston rod and the power gear, the second end of the piston rod having a rod end axis offset from the power gear shaft, so that as the second end of the rod strokes, the power gear rotates;

a rim gear having teeth on that mesh with teeth on the power gear, causing the power gear to orbit around an axis of the rim gear while the rim gear is stationary, the axis of the rim gear being on the axis of the cylinder, the rim gear having a pitch diameter that is a multiple of a pitch diameter of the power gear;

the rim gear being rotatable an increment less than one revolution about its axis, causing the position of the eccentric relative to the rim gear to change, thereby varying the length of the stroke of the piston; and

a bias member connected to the rim gear to urge the rim gear to rotate toward a position of maximum stroke of the piston.

2. The drive apparatus according to claim 1, wherein the rod end axis is located radially outward from the power gear, relative to the power gear shaft.

3. The drive apparatus according to claim 1, wherein the rod end axis is spaced radially from a pitch diameter of the power gear.

4. The drive apparatus according to claim 1, wherein in the maximum stroke position, with the piston at top dead center, the rod end axis intersects the axis of the cylinder.

5. The drive apparatus according to claim 1, further comprising a stop that limits the extent of rotation of the rim gear toward the maximum stroke position.

6. The drive apparatus according to claim 1, further comprising:

a first stop that stops rotation of the rim gear in one direction; and

a second stop that stops rotation of the rim gear in the opposite direction.

7. The drive apparatus according to claim 1, wherein an increase in load requirements of the drive apparatus overcomes the bias member and causes the rim gear to rotate toward a minimum stroke position.

8. The drive apparatus according to claim 1 further comprising:

a crankshaft gear concentrically mounted to a primary shaft for rotation therewith, the power gear shaft engaging the crankshaft gear at a point offset from the primary shaft, wherein as the power gear orbits about the axis of the rim gear, the crankshaft gear and primary shaft rotate.

9. The drive apparatus according to claim 1, further comprising at least one valve for admitting atomized fuel to the cylinder.

10. The drive apparatus according to claim 1, further comprising an advance stop that limits rotation of the rim gear away from the maximum stroke position, and wherein while the rim gear is at the advance stop and the piston at top dead center, the rod end axis is offset from the axis of the cylinder.

11. A drive apparatus, comprising:

a piston slidably carried in a cylinder for stroking reciprocally along an axis of the cylinder;

a piston rod having a first end connected to the piston and a second end;

a power gear concentrically mounted to a power gear shaft;

an eccentric rigidly connected to the power gear, the second end of the piston rod being rotatably mounted to the eccentric for rotation about a rod end axis that is radially outside of a pitch diameter of the power gear while the piston is in a top dead center position; and

a rim gear having teeth that mesh with teeth on the power gear, causing the power gear to orbit about an axis of the rim gear as the power gear rotates.

12. The drive apparatus according to claim 11, wherein the rim gear is rotatable about its axis for an increment less than one revolution to vary the rotational position of the rod end axis relative to the rim gear.

13. The drive apparatus according to claim 11, wherein the rim gear is rotatable about its axis for an increment less than one revolution; and wherein the apparatus further comprises:

a bias member that urges the rim gear to rotate toward a position that places the rod end axis on the axis of the cylinder when the piston is at top dead center.

14. The drive apparatus according to claim 11, wherein the rim gear is rotatable about its axis in first and second directions; and wherein the apparatus further comprises:

a first stop that stops rotation of the rim gear in the first direction at a point where the rod axis intersects the cylinder axis while the piston is at top dead center; and

a second stop that stops rotation of the rim gear in the second direction no more than 90 degrees from the first stop.

15. The drive apparatus according to claim 11, wherein the second stop is no farther than 55 degrees from the first stop.

16. The drive apparatus according to claim 11, wherein the rim gear is rotatable about its axis for an increment less than one revolution; and wherein the apparatus further comprises:

a bias member that urges the rim gear to rotate toward a maximum stroke position that places the rod end axis on the axis of the cylinder when the piston is at top dead center; and

wherein a load of sufficient magnitude applied to the drive apparatus overcomes the bias member to rotate the rim gear away from the maximum stroke position.

17. A method of translating rotary motion and reciprocating motion of a piston stroking within a cylinder and connected to a first end of a piston rod, comprising:

(a) connecting a power gear concentrically to a power gear shaft;

(b) rigidly connecting an eccentric to the power gear, and rotatably connecting a second end of the rod to the eccentric for rotation about a rod end axis that is offset from the power gear shaft;

(c) mounting the power gear into meshing engagement with a rim gear;

(d) connecting the power gear shaft eccentrically to a crankshaft gear, which is connected concentrically to a crankshaft;

(e) biasing the rim gear to rotate in a first direction toward a position where the rod end axis and an axis of the power gear shaft simultaneously pass through an axis of the cylinder; and

(f) reciprocating the piston, rotating the power gear in orbital motion about an axis of the rim gear, and rotating the crankshaft gear; and

(g) as load increases, rotating the rim gear in a second direction toward a position wherein the rod end axis of the piston rod is laterally offset from the axis of the cylinder while the axis of the power gear shaft passes through the axis of the cylinder.

18. The method according to claim 17, wherein step (g) comprises overriding the bias of the rim gear in response to the torque required to rotate the crankshaft.

19. The method according to claim 17, wherein step (g) comprises stopping rotation of the rim gear in the second direction no more than 90 degrees from the position of step (e).

20. The method according to claim 17, wherein step (g) comprises stopping rotation of the rim gear in the second direction no more than 55 degrees from the position of step (e).